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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,739	04/02/2004	Andrew Jeremiah Burns	2003P05056US01	1387

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Siemens Corporation
Intellectual Property Department
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EXAMINER

IVEY, ELIZABETH D

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/816,739

Applicant(s)

BURNS ET AL.

Examiner

Elizabeth Ivey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 12 and 13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>02 April 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-11, drawn to a ceramic thermal barrier coating, classified in class 428, subclass 689
- II. Claims 12-13, drawn to a method of predicting a performance, classified in class 707 subclass 1.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions are not disclosed as capable of being used together and the method of Group II may be used to evaluate any coating.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with John Musone on March 9, 2006 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

Claim 7 is objected to because of the following informalities: line 1 of the claim recites "wherein of the projections". This sentence does not make sense as written. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 6 recites the limitation "the mixed oxide layer" in line 7. There is insufficient antecedent basis for this limitation in the claim. Claim 1 and claim 6 do not indicate any mixed oxide layer in the structure.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,482,537

B1 to Strangeman et al.

Regarding claim 1, Strangeman discloses a thermal barrier coating having nanometer sized particle deposited within the columnar zirconia grains and with layers having a thickness of 50-500 preferably 100-200nm (abstract and column 4 lines 21-36).

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,800,934 to Qadri et al.

Regarding claim 1, Qadri discloses a thermal barrier coating (column 1 lines 9 and 10 having particle sizes ranging from 65 to 205 angstroms.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,677,064 B1 to Subramanian et al.

Regarding claim 1, Subramanian discloses a thermal barrier coating having an overlay phase with a thickness between 2 angstroms and 10 micrometers thick (abstract and column 6 lines 13-28)

Claims 1-4 6-8 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,689,487 B2 to Murphy.

Regarding claim 1, Murphy discloses a thermal barrier coating with an alumina layer thickness of .01-.2 microns, which equals 10-200 nm (column 4 lines 41-45).

Regarding claims 2-4, Murphy discloses a thermal barrier coating having a MCrAlY bond coat, a thermally grown oxide layer and a electron beam physical vapor deposited ceramic oxide yttria stabilized zirconia layer (column 3 lines 46-51, column 4 lines 17-19 and column 5). Although Murphy does not expressly disclose a mixed oxide layer having particles of less than 100nm, less than 50nm or 10-100nm or a ratio of thickness of the mixed oxide layer to the thermally grown oxide layer of 0.333-0.1667, a layer of particle containing mixed oxides of alumina and zirconia having particle sizes less than 100nm and having a thickness ratio with respect to the thermally grown thickness would inherently be formed between the thermally

grown oxide layer and the zirconia layer. A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composition and application process in relation to the thermally grown oxide layer and the zirconia layer, the claimed physical property relating to the particle size is inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Regarding claims 6-7, Murphy discloses all of the limitations of claim 1 and further discloses a thermal barrier coating having a MCrAlY bond coat, a thermally grown oxide layer and a electron beam physical vapor deposited ceramic oxide yttria stabilized zirconia layer (column 3 lines 46-51, column 4 lines 17-19 and column 5). Although Murphy does not expressly disclose the nano-sized features as alumina projections extending across the interface from the mixed oxide layer into the insulating material layer with a cross sectional lineal density between 1 and 10 projections per 200nm and an aspect ratio between 5 and 50, a chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composition and method of production in relation to the thermally grown oxide layer and the zirconia layer, the claimed physical properties relating to the mixed oxide layer projection density and aspect ratio are inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Regarding claim 8, Murphy discloses all of the limitations of claim 1 and further discloses a yttria stabilized zirconia thermal barrier coating having columnar grains. A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP* 2112.01. Because the prior art exemplifies the applicant's claimed composition in relation to the YSZ insulating thermal barrier coating, the claimed physical property relating to the cross sectional width is inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art. Additionally, applicant is reminded that it is the product itself which must be new and unobvious, see In re Pinkington 162 USPQ 145, 147 (C.C.P.A. 1969). Product by process claimed are not patentably distinct over product claims unless it can be shown that the product produced by the process is in some manner measurably distinct from the product produced by another process, therefore there will be no weight given to the product by process verses product claims.

Regarding claim 11, Murphy discloses a thermal barrier insulating coating of yttria stabilized zirconia formed by electron beam physical vapor deposition having primary columnar grains with longitudinal axes that extend transversely to the surface of the component and secondary columnar grains that extend laterally therefrom (column 4 lines 50-57). A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d

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1655, 1658 *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composition and structure in relation to the columnar grains, and because applicant acknowledges on page 4 lines 21-24 that the columnar structures determine the claimed physical property relating to the specific surface area is inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Claims 1-8 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by U.S. Patent 6,544,665 B2 to Rigney et al.

Regarding claim 1, Rigney discloses a yttria stabilized zirconia thermal barrier coating with small precipitates preferably 2-500nm in size overlapping the claimed range (column 5 lines 1-7, 21-23 and 29-31).

Regarding claims 2-4, Rigney discloses the thermal barrier coating to include a MCrAlX layer, where M may be Ni and X may be yttrium as a bond coat with an oxidation layer, a yttria stabilized zirconia (YSZ) ceramic thermal barrier layer and 2-500nm size particles of alumina and impurities of oxides of at least one of silicon, titanium, iron nickel, sodium, lithium, copper, manganese and potassium found in the grain boundaries including between the oxidized alumina layer and the ceramic thermal barrier layer (column 1 lines, column 3 lines 53-55, column 4 lines 3-16 and column 5 lines 15-30).

Regarding claim 5, Rigney discloses all of the limitations of claim 2 and shows the ratio of the thickness of the oxide layer as being approximately between 1/6 of the bond coat. Alternatively, although Rigney does not expressly disclose in words the ratio of thickness as being between 0.333 and 0.1667, Rigney discloses the oxide layer chemically bonds the ceramic thermal barrier layer to the bond coat (column 4 lines 7-14 and figure 2). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adjust the thicknesses for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 6-7, Rigney discloses all of the limitations of claim 1 and further discloses a thermal barrier coating having a MCrAlY bond coat, a thermally grown oxide layer and an electron beam physical vapor deposited ceramic oxide yttria stabilized zirconia layer (column 4 lines 2-17). Although Murphy does not expressly disclose the nano-sized features as alumina projections extending across the interface from the mixed oxide layer into the insulating material layer with a cross sectional lineal density between 1 and 10 projections per 200nm and an aspect ratio between 5 and 50, a chemical composition and its properties are inseparable. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composition and method of production in relation to the thermally grown oxide layer and the zirconia layer, the claimed physical properties relating to the mixed oxide layer projection density and aspect ratio are inherently present in the prior art.

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Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Regarding claim 8, Rigney discloses all of the limitations of claim 1 and further discloses a yttria stabilized zirconia thermal barrier coating having columnar grains (column 4 lines 13-17). A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP 2112.01*. Because the prior art exemplifies the applicant's claimed composition in relation to the YSZ insulating thermal barrier coating, the claimed physical property relating to the cross sectional width is inherently present in the prior art.

Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Additionally, applicant is reminded that it is the product itself which must be new and unobvious, see In re Pinkington 162 USPQ 145, 147 (C.C.P.A. 1969). Product by process claimed are not patentably distinct over product claims unless it can be shown that the product produced by the process is in some manner measurably distinct from the product produced by another process, therefore there will be no weight given to the product by process verses product claims.

Claims 6-7 are rejected under 35 U.S.C. 102(e) as anticipated by U.S. Patent 6,677,064 B1 to Subramanian.

Regarding claims 6-7, Subramanian discloses all of the limitations of claim 1 and further discloses a thermal barrier coating having a MCrAlY bond coat, a thermally grown oxide layer and a electron beam physical vapor deposited ceramic oxide yttria stabilized zirconia layer (abstract and column 4 lines 12-57). Although Subramanian does not expressly disclose the nano-sized features as alumina projections extending across the interface from the mixed oxide layer into the insulating material layer with a cross sectional lineal density between 1 and 10 projections per 200nm and an aspect ratio between 5 and 50, a chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP* 2112.01. Because the prior art exemplifies the applicant's claimed composition and method of production in relation to the thermally grown oxide layer and the zirconia layer, the claimed physical properties relating to the mixed oxide layer projection density and aspect ratio are inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the prior art.

Claim Rejections - 35 USC § 102/103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9-10 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Patent 6,689,487 B2 to Murphy.

Regarding claims 9 and 10, Murphy discloses all of the limitations of claim 1 and further discloses a thermal barrier coating having primary columnar grains having longitudinal axes that extend transversely to the surface of the component and secondary columnar grains that extend laterally therefrom (column 4 lines 50-57). Although Murphy does not expressly disclose the lengths or the tip radii of the secondary columnar structures, A chemical composition and its properties are inseparable. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 *MPEP* 2112.01. Because the prior art exemplifies the applicant's claimed composition and application methods in relation to the thermal barrier insulation coating, the claimed physical property relating to the length and tip radii of the secondary columnar structures is inherently present in the prior art. Absent an objective evidentiary showing to the contrary, the addition of the claimed physical property to the claim language fails to provide patentable distinction over the

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prior art. Alternatively, Murphy discloses that the secondary columnar grains serve to decrease conductivity (column 6 lines 10-17). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adjust the length for the intended application to achieve the desired conductivity reduction, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim Rejections - 35 USC § 103

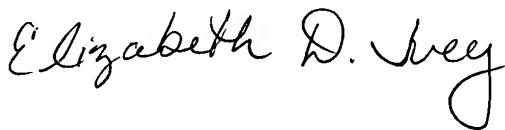
Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent Application to Murphy. Although Murphy does not expressly disclose the ratio of the oxide layer to the bond coat as between 0.33 and .01667, Murphy does disclose thickness of the bond coat as 1.5-30 mils and the oxide coat as .01-2 microns, that the thicknesses are able to be manipulated and that the oxide coating is used to adhere the bond coat to the ceramic thermal barrier layer (column 4 lines 3-6, 18-27 and 40-45). Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the thickness ratio for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

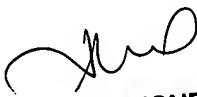
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Ivey whose telephone number is (571) 272-8432. The examiner can normally be reached on 7:00- 4:30 M-Th and 7:00-3:30 alt. Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth D. Ivey



JENNIFER MCNEIL
PRIMARY EXAMINER
3/11/06